

176

	Type	L #	Hits	Search Text	DBs	Time Stamp	Com ments	Er ror Def inition	Er rors
1	B R S	L1	4323	705/1,26,27,10,28,29,30,32,34,35,36,37,40,400,412,413,52,63.ccls.	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/28 16:18			0
2	B R S	L2	10415	705/\$7.ccls.	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/28 16:18			0
3	B R S	L3	4124	telecommunication near3 services	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/28 16:18			0
4	B R S	L4	12	identif\$3 with future with (rate\$1 or tariff\$1 or plan or subscription\$1) with chang\$3	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/28 17:22			0
5	B R S	L5	3	1 and 4	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/28 16:23			0
6	B R S	L7	0	6 and 2	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/28 16:24			0
7	B R S	L8	0	6 and 3	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/28 16:24			0
8	B R S	L6	9	4 not 5	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/28 16:24			0
9	B R S	L9	436	future with (rate\$1 or tariff\$1 or plan or subscription\$1) with chang\$3	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/28 17:09			0
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13	B R S	L13	42	4 or 10	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/28 16:31			0
14	B R S	L15	307	9 not 13	USPAT	2003/07/28 16:31			0
15	B R S	L16	7	15 and 3	USPAT	2003/07/28 16:34			0
16	B R S	L17	45	13 or 16	USPAT	2003/07/28 16:34			0
17	B R S	L18	28	select\$3 with future with plan	USPAT	2003/07/28 16:35			0
18	B R S	L19	300	15 not 17	USPAT	2003/07/28 16:35			0
19	B R S	L20	2	18 and 19	USPAT	2003/07/28 16:35			0

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21	B R S	L22	11	1 and 21	USPAT	2003/07/28 16:37			0
22	B R S	L23	15	21 not 22	USPAT	2003/07/28 16:38			0
23	B R S	L24	73	17 or 18	USPAT	2003/07/28 16:38			0
24	B R S	L25	298	19 not 24	USPAT	2003/07/28 16:39			0
25	B R S	L27	282	billing adj cycle	USPAT	2003/07/28 16:39			0
26	B R S	L28	0	26 and 27	USPAT	2003/07/28 16:39			0
27	B R S	L26	62	25 and utility	USPAT	2003/07/28 16:40			0
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33	B R S	L36	4011	future with (rate\$1 or tariff\$1 or plan or subscription\$1)	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/28 17:09			0
34	B R S	L37	2	3 and 36 and 27	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/28 17:13			0
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36	B R S	L39	0	(rate adj plan) with consistent	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/28 17:14			0
37	B R S	L40	101	choos\$3 and 9	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/28 17:14			0
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39	B R S	L42	2412	future same (rate\$1 or tariff\$1 or plan or subscription\$1) same (chang\$3 or select\$3)	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/28 17:23			0
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41	B R S	L45	0	43 and 44	EPO	2003/07/28 17:24			0
42	B R S	L43	32	future same (rate\$1 or tariff\$1 or plan or subscription\$1) same (chang\$3 or select\$3)	EPO	2003/07/28 17:29			0
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44	B R S	L50	2	46 and prepa\$3	EPO	2003/07/28 17:30			0
45	B R S	L46	66	utility and (rate\$1 or tariff\$1)	EPO	2003/07/28 17:32			0
46	B R S	L51	10	705/412.ccls.	EPO	2003/07/28 17:32			0
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PR Newswire

July 21, 1998

IPL Launches Elect Plan Customer Options Program

Customers Will Receive Information In Next IPL Bill

INDIANAPOLIS, July 21 /PRNewswire/ -- Indianapolis Power & Light Company customers have begun receiving information in their monthly electric bills on how they may choose one of IPL's new unregulated bill payment options. All IPL customers will receive a billing insert within the next month that will tell how to find out more information about the Elect Plan(SM).

"Allowing IPL customers to purchase electricity in different ways and to learn more about how their electric bills are affected by changes in price and usage will help prepare not only our customers, but our company, for a future where even more choices are available," said IPALCO Chairman John R. Hodowal. "We are learning what tools are necessary to provide customers with options. We look forward to learning more about how our customers prefer to purchase and use electricity."

The Elect Plan(SM) will allow an eligible IPL customer to enter into written agreements for one of the following options:

* Sure Bill Option -- Residential customers may pay the same bill amount

each month for 12 months, regardless of how much electricity they use.

And, unlike IPL's regulated budget billing payment plan, there is no settlement at the end of the term. Additionally, customers choosing the Sure Bill Option who prepay the total Sure Bill amount for one year

will receive a 3.2 percent discount.

* Fixed Rate Option -- Customers may pay a guaranteed fixed rate for

one-, two- or three-year periods. Customers choosing this option will not be affected by the normal regulated rate adjustments for fuel cost variations, or electric rate changes which otherwise might occur due to rulings by the IURC. IPL is also currently offering a discount in rates for customers who elect this option. The current amount of the discount varies with the length of the contract:

* A customer choosing a one-year contract will receive a 3% incentive

discount;

* A customer choosing a two-year contract will receive a 2% incentive

discount; and

* A customer choosing a three-year contract will receive a 1% incentive

discount.

* Green Power Option -- Customers may direct IPL to purchase environmentally friendly or "green" power. Prices for this option will be based on the actual costs to obtain power, such as water (hydro), sun (solar) and wind power from other regions of the country. These power purchases would displace power generated from fossil fuel or nuclear sources.

These choices are purely optional. IPL customers may choose to take no action and remain on IPL's standard rates and charges. Customers who choose the Sure Bill or Fixed Rate option may pay less or they may pay more than they would by remaining on IPL's standard, regulated rates and charges. There is potential for risk and potential for reward, depending on what option, if any, a customer chooses.

How to get information:

Interested customers should return the reply card enclosed in their next IPL bills to receive a detailed packet of information about the specific Elect Plan(SM) options.

Customers may also request information from the IPALCO home page on the worldwide web at www.ipalco.com.

Elect Plan(SM) representatives will be available Tuesdays through Fridays to answer questions at 261-3456 or outside the Indianapolis area, toll-free, at 888-890-8747. IPL requests that customers avoid calling about Elect Plan(SM) options on Mondays due to the higher volume of general customer

service calls that routinely occur on Mondays. Questions may also be directed electronically to electplan@ipalco.com.

Customers who request information will be sent a package which includes:

- * The Elect Plan(SM) Program brochures requested by the customer;
- * A history of the customer's electricity use at the service address;
- * A rate comparison of the Elect Plan(SM) options; and
- * Contracts for the options available to the customer.

To select one of the Elect Plan(SM) options, customers must fill out and sign the appropriate contract and return it to IPL by the date specified on the contract.

Eligibility:

Any residential customer who has lived in his or her current residence and has been an IPL customer at that residence with electric usage for at least twelve months is eligible for the Sure Bill Option. The Fixed Rate and Green Power options are available to all IPL residential customers, as well as small and mid-sized commercial and industrial customers. All Elect Plan(SM) customers must be current in payment of IPL electric bills.

Authorization:

The Indiana Utility Regulatory Commission authorized IPL to implement the Elect Plan(SM) on March 18, 1998. The Elect Plan(SM) options were also agreed to by the Indiana Office of Utility Consumer Counselor, the Indiana agency that represents the interests of all utility consumers and the public in matters related to the provision of utility services, as well as the Citizens Action Coalition of Indiana and United Senior Action, two noted, statewide consumer advocacy groups.

About the company:

Indianapolis Power & Light Company (IPL) is a subsidiary of IPALCO Enterprises (NYSE: IPL), a multi-state energy company providing a variety of energy products and services. IPL provides retail electric service to approximately 420,000 residential, commercial and industrial customers in Indianapolis and portions of other Central Indiana counties.

SOURCE IPALCO Enterprises

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/CONTACT: Marni Lemons of IPALCO, 317-261-8219, or mlemons@ipalco.com/

/Web site: <http://www.ipalco.com/>

(IPL)

CO: IPALCO Enterprises; Indianapolis Power & Light Company ST: Indiana IN: UTI
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Business Wire

Nov 2, 1998

Virginia Power Proposes Pilot Program to Allow 24,000 Customers to Choose Their Electricity Supplier.

RICHMOND, Va.--(BUSINESS WIRE)--Nov. 2, 1998--About 24,000 Virginia Power (NYSE: D) customers would be allowed to switch to competing electricity suppliers under a proposal the company filed Monday with the State Corporation Commission. Virginia Power would continue to deliver the energy across its wires and perform administrative and service restoration functions under the plan.

The pilot program, known as Power Choice Virginia, is expected to begin enrolling its first customers late next year, with the actual delivery of electricity purchased from competitive suppliers to customers proposed to start in early 2000. The price of generating the electricity - or about 60 percent of today's bill -- would be set by the competitive market, not by regulation.

"Virginia Power is committed to bringing competition to the electric utility industry in Virginia," said Norman Askew, president and chief executive officer. "With competition comes lower prices and better customer service - two things Virginia Power already does very well. In the competitive future, we will perform even better and emerge a winner for our customers and shareholders alike."

The SCC in March ordered Virginia Power to develop and file the details, objectives and characteristics of a retail access pilot program. The pilot will allow the company and the state to gain hands-on experience on the technical and administrative aspects of implementing full retail competition.

Power Choice Virginia is designed to dovetail with Virginia's transition to full retail electric competition on January 1, 2002, as called for in a bill passed by the 1998 General Assembly and signed into law by Gov. Jim Gilmore. The legislature needs to address several issues before Power Choice Virginia or full retail competition can be implemented. These issues include the recovery of just and reasonable stranded costs by incumbent electric utilities, the changing of tax law to ensure a "level playing field" for all competing energy suppliers and guard against undue impact on government revenues, the establishment of rules for competitive electric

suppliers and the creation of new consumer protection measures.

Comprehensive consumer protection measures are a cornerstone of Virginia Power's proposal. These measures include an extensive consumer education effort and a recommendation that the SCC license all competitive electric suppliers to ensure they are financially viable and technically capable to serve customers.

Power Choice Virginia features two plans. One is for residential and small and mid-sized commercial customers in the greater Richmond area in the first year of the pilot, potentially expanding to other sections of Virginia in the second year. The other plan is for large commercial and industrial customers throughout the company's Virginia service area.

The pilot is scheduled to last for approximately two years, but customers will be able to drop out of the pilot at any time if they are dissatisfied and return to Virginia Power's regulated rates. Virginia Power will ensure delivery to every participant in the pilot, even if a customer's selected competitive supplier failed to deliver for any reason.

Features of the residential and small commercial customer plan include:

- Choice being offered in the first year to 17,000 individual residential and about 1,700 small commercial customers who reside in the city of Richmond, town of Ashland and counties of Henrico, Chesterfield and Hanover. The greater Richmond area was selected because it represents the demographics of the entire Virginia Power system and includes urban, suburban and rural areas. A lottery will be conducted to select participants if the pilot is oversubscribed.

- The aggregation, or banding together, of 5,000 individual residential customers into larger accounts to try and obtain a lower rate from electricity suppliers. Aggregation groups could be forged by neighborhood associations, churches, civic groups or local governments. The aggregation groups would also be initially limited to the greater Richmond area.

- A single bill from Virginia Power regardless of which supplier a customer chooses. The bill will display the energy charge from the electricity supplier separated, or unbundled, from the Virginia Power charges. Participating customers would also be able to control how much sales marketing they receive from suppliers. They will have the option to instruct Virginia Power not to release account information - names, addresses, telephone numbers - to competitive suppliers. Those customers would then have to shop by contacting the suppliers to receive their offer.

The large commercial and industrial pilot program would include the participation of at least three large commercial and two industrial customers. They will be allowed to procure approximately 5 megawatts of their load, on average, from a competitive supplier.

These customers can be located anywhere in the company's Virginia service area.

Virginia Power is the principal subsidiary of Dominion Resources Inc. (NYSE: D), an international energy company based in Richmond. More information on Virginia Power can be obtained on the Internet at www.vapower.com. The Power Choice Virginia proposal can be found on the Internet at www.vapower.com/news/releases/release981102.html.

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Environment

Sept, 1999

Power switch: will the restructured electric utility system help the environment?(includes related article on PURPA, natural gas and choosing the right electricity provider)

Author/s: Richard F. Hirsh

Will the Restructured Electric Utility System Help the Environment?

Consumers across the United States are discovering that changes are under way in the electric power industry. Perhaps they saw a commercial on television in which a company with an odd, modern-sounding name tried to persuade them to buy its "brand" of electricity. Or perhaps they noticed that articles on hearings before state legislatures and utility commissions have moved from the business section to the front page of their newspaper. Maybe they received a letter advising them that they can now choose an electric power provider just as they do a long-distance telephone company or internet service. As these situations suggest, several states have already introduced competition into their electric power sectors, and a few other states are contemplating this move. For its part, Congress is gearing up for another round of debate over whether or not it should enact comprehensive "restructuring" legislation for the industry.

What do these changes mean for the environment? Some fear that reduced regulatory oversight will lead to environmental abuses and a market dominated by the cheapest, dirtiest sources of electric power. Others, noting that traditional regulation has produced only grudging, token actions by electric utilities to protect the environment, hope that new technology will prove both cleaner and cheaper and that people will voluntarily buy "green" power generated from renewable resources.

Which vision is valid? Perhaps both, and perhaps neither. Overall, there are reasons to be cautiously optimistic that a properly restructured utility system can lead to a cleaner environment. The most important requirements are that people be informed and that they be willing to act both as green citizens and as green consumers - that is, to vote for sound public policies and to buy products and services that help protect the planet.

Regulation and the Environment

When regulation of electric utilities began in the first decade of the 20th century, environmental protection was not a priority. Rather, state and municipal politicians were concerned that the electric utility industry, which originated in the 1880s, seemed bent on consolidating small firms into large ones and eliminating competition. In their defense, company managers argued that large firms could serve customers more efficiently by realizing the economies of scale associated with extensive transmission networks and large steam-turbine generators - in other words, that power providers were "natural monopolies."⁽¹⁾

Accepting this logic, in 1907 state legislatures in New York and Wisconsin gave electric utilities the right to operate in defined geographical areas without competition. But to ensure that the companies passed the benefits of consolidation on to customers through "fair" prices and good service, they also established regulatory commissions. These bodies were authorized to examine the companies' books, to approve or reject proposed rates for electricity, and even to pass judgment on the construction of new generating and transmission facilities. By 1922, 37 states had created regulatory commissions to deal with this new type of business that provided a vital service to society.⁽²⁾ Overall, the public perceived regulation to be effective: Instead of gouging their customers, utilities were generally seen as offering good service at reasonable prices. Prices, in fact, have declined dramatically over this century (see [ILLUSTRATION FOR FIGURE 1 OMITTED] on this page).⁽³⁾ For their part, many utilities were equally satisfied: Regulation removed the threat of competition, made their securities attractive to investors, and freed them from the threat of municipal takeovers.

With few exceptions, state regulators did not deal with the environmental impacts of generating, distributing, or using electricity. That situation changed in the 1970s, however, largely as a result of the burgeoning environmental movement, which had gained widespread popular and political support. Utility managers could no longer build power plants with minimal concern for local environmental conditions; rather, they needed to submit environmental impact statements and win approval from new federal bureaucracies (such as the Environmental Protection Agency) as well as from state environmental regulators. In California, for example, the legislature created the California Energy Resources Conservation and Development Commission (more commonly known as the California Energy Commission (CEC)) in 1974. Among other goals, CEC sought to help the state meet its energy needs in an environmentally responsible fashion.⁽⁴⁾

As part of this effort, regulators began to steer utilities away from building new fossil-fuel and nuclear power plants that they felt would pollute or otherwise degrade local air and water. In 1978, for example, the Wisconsin Public Service Commission established a moratorium on the construction of nuclear power plants in the state.^s Taking a different approach, California regulators in the

1980s and 1990s required utility companies to purchase a set amount of power produced by wind turbines, solar generators, and other renewable technologies. At the same time, they encouraged utilities to pursue research on these technologies so that their use would increase and their cost would decrease.(6)

A federal law, the Public Utility Regulatory Policies Act of 1978 (PURPA), mandated even further efforts to protect the environment. The law instructed state commissioners to establish mechanisms that would encourage nonutility companies (and even homeowners) to generate electricity from wind, sun, water, and geothermal sources and required utility companies to purchase such electricity for distribution to their customers. It also spurred manufacturing companies to obtain a double benefit from fossil fuels through a process known as cogeneration. (In this process, the burning of coal, oil, natural gas, or biomass produces steam that drives electricity-generating turbines before the energy is directed to the manufacturing processes themselves). Congress hoped the law would stimulate the use of technologies that produce electricity more efficiently and in more environmentally benign ways than those employed by electric utilities. (For more on PURPA, see the box on page 8.)

State regulators were also concerned about energy efficiency, though more because of the changing market conditions of the 1970s than because of a desire to enhance environmental quality. Electricity rates increased dramatically in the middle of the decade when the Organization of Petroleum Exporting Countries (OPEC) sharply curtailed shipments of oil. The resulting pressure on regulators to reduce electricity bills led them to realize that energy conservation could benefit consumers financially. Even more importantly, in the late 1970s utilities began reducing their investment in new generating capacity owing to high interest rates and popular opposition to utility construction, both of which increased the cost of building power plants. Although the demand for power was rising much more slowly than in previous decades (about 2.3 percent per year as opposed to 7.0 percent per year (see [ILLUSTRATION FOR FIGURE 2 OMITTED] on page 32)), regulators were seriously concerned about shortfalls.

To head off problems, regulators in a few states (notably California, Wisconsin, and some of the New England states) gave utilities financial incentives to encourage less consumption of power. In Wisconsin, for example, utilities were allowed to earn higher profits if they met predetermined goals for lowering demand. The utilities responded to this carrot by offering rebates to customers who purchased energy-efficient appliances such as improved refrigerators and air conditioners.⁷ In California, regulators in 1990 allowed utilities to share the savings they helped customers achieve. If a business saved \$100,000 by installing high-efficiency lighting and cooling equipment, for example, the utility would earn a \$15,000 reward.⁽⁸⁾ Such regulatory incentives helped motivate utilities to encourage energy efficiency in ways that benefited both them and their customers while helping to reduce the environmental impact of electricity production and use.

Restructuring

The environmental benefits that have been achieved through the regulatory process could be threatened by what may be a wholesale transformation of the U.S. electric utility industry, however. The impetus for such a transformation lies partly in the technological advances of recent years. Cogeneration and wind turbines, for example, can now compete effectively with utilities' nuclear and fossil-fuel plants, which became much more expensive to build and operate during the 1970s and 1980s. Even more importantly, independent energy companies using natural gas to fire relatively small, highly efficient "combined cycle" turbines modeled on jet aircraft engines have come to dominate the market for new generating capacity. As a result, few regulated utilities are now planning to build new capacity of their own, preferring instead to purchase the additional power they need from these independent firms.

As the utilities have lost their technological - and cost - advantage over nonutility companies, many analysts have wondered whether they should continue to be regulated. Further impetus for deregulation is coming from large industrial customers, who would like to be able to shop for power throughout the country, taking advantage of their market clout to obtain the cheapest rate possible. Even the public is no longer as wedded to regulation as it was previously. In the 1970s and 1980s, policymakers began restructuring and deregulating numerous industries, including the telecommunications, commercial aviation, securities, banking, petroleum, natural gas, and trucking industries. These initiatives were often perceived positively, with most customers being able to obtain innovative new services at declining prices.

The Persian Gulf War of early 1991 brought matters to a head as far as the restructuring of the utility industry was concerned. With the supply of oil from Iraq cut off, prices escalated and many policymakers believed the United States would suffer another energy crisis. Though the high prices quickly abated after a rapid conclusion to the war, President George Bush still pursued the development of an overall energy policy to reduce the United States' dependence on oil. But instead of government mandates, the Bush administration wanted to use free-market forces to encourage energy exploration and wise energy use. Congressional debate over the new energy policy took longer than expected, but in 1992 the president signed the Energy Policy Act into law.⁽⁹⁾ Although the amount of oil used by electric utilities had declined dramatically since the 1970s, the Bush administration nonetheless wished to subject the industry to market forces to encourage technological innovations and even greater energy efficiency.

From the standpoint of the industry, the most important provision of the new law was that it permitted states to abandon the existing regulatory structure and introduce an element of competition into the market for electricity services. Within months, several states began studying the possibility of deregulation, and by 1996 four states had passed laws creating a free market in electricity after a

relatively brief transition period. Eager to give competition a try, New Hampshire inaugurated a pilot program in May 1996 that allowed 11,000 residential customers to choose the company that would provide their electricity. About three dozen firms entered the market, offering rebates, bird feeders, spruce trees, showerheads, and Ben and Jerry's ice cream as inducements to sign up with them. The sources of the power these firms were offering varied. Some of them obtained their electricity from distant coal-burning plants; others offered to supply environmentally friendly power generated from renewable resources.(10) Other states subsequently took advantage of the opportunity to deregulate their electric power systems. By the end of May 1999, 19 states had passed laws to restructure their utility industries, gradually increasing competition and reducing regulatory oversight by state commissions.(11) A few states, such as California, have gone all the way and completely opened their electricity markets to competition.

Hopes and Fears

In a restructured electric utility system, state regulators will have less control over activities that have an impact on the environment. Yet observers disagree over the ultimate significance of this. Seven different issues have emerged in the policy debate over restructuring:

Is dirty cheaper? Optimists hope that increased competition will favor new generating technologies that will generally be both cheaper and cleaner than those currently in use. In particular, the U.S. Department of Energy predicts that comparatively clean, combined-cycle natural gas plants will generate power at 3.10 cents per kWh in 2005, compared with 4.03 cents per kWh for conventional pulverized-coal plants, and that natural gas will fuel 85 percent of the 1,344 new power plants expected to come on line by 2020.(12)

Other analysts glumly contend that the nation's coal plants, especially the older ones in the Midwest, will prove surprisingly resilient. These plants are cheap to operate, both because they were built before 1970 and are generally fully paid for and because (for political reasons) they are exempt from the most stringent provisions of the Clean Air Act. They are undeniably dirty, emitting nitrogen and sulfur particles at up to 10 times the rate permitted at new plants. Largely because of these exempt facilities, a mere 10 percent of the plants burning fossil fuels account for more than one-half of the air pollution produced by the utility sector as a whole.(13) Exemption from current air pollution standards has already encouraged utilities to keep these plants in service far longer than their envisioned life span. Some analysts fear that restructuring would add to this perverse incentive by allowing the owners of these plants to market cheaper power far afield. Indeed, most of the plants in question have excess capacity: While they generally operate only 60 percent of the time now, they may be able to operate 80 percent of the time given great enough market demand.(14)

Is cheaper better? Competition should accelerate the decline in

(inflation-adjusted) electricity prices that has been under way since the mid-1980s. According to traditional economic theory, electricity use will increase as prices fall, with a corresponding increase in the negative consequences. Indeed, the U.S. Department of Energy predicts that a rise in electricity consumption will accompany the decline in prices. In addition, changes in demand patterns may increase the use of baseload coal plants (which operate most of the time) relative to that of natural gas plants (which are generally brought on line only to meet the demand for electricity at peak times).(15)

Shedding programs to cut costs. To become more competitive, many utility companies have begun shedding as many "nonessential" services as they can to trim their costs. This trend has been noticeable in companies' spending on energy-efficiency programs: In 1993 and 1994, such spending amounted to about \$2.7 billion; in 1997, it dropped to \$1.6 billion as the companies looked ahead to increasing deregulation.(16) In some cases, the political process abets this trend. For example, in March of this year, the state of Maryland adopted a restructuring law that contains little or no provision for energy efficiency. As a result of this, Maryland will become the first state with a previous commitment to energy efficiency to abandon that commitment in a competitive market.

Restructuring will also affect utilities' purchases of renewable energy. In California, for instance, regulators can no longer require utilities to purchase such energy; instead, the state's restructuring law provides for a competition transition charge (CTC) to be imposed on each kilowatt-hour sold until 2002. Most of the CTC funds will be used to recompense utilities for their nuclear plants, but \$540 million will support a variety of renewable energy programs. After 2002, however, these facilities may have to depend entirely on the market for support.

"Manufactured" energy versus "constructed" energy. Several analysts detect a massive trend under way in the world energy system - a trend away from the dominance of large-scale, centralized, constructed power plants that deliver power to scattered users through complex transmission and distribution networks and toward the use of small-scale, manufactured technologies that generate and store energy where consumers need it. In this vision, fuel cells, gas-fired microturbines, photovoltaic panels, passive solar architecture, reciprocating engines, double-pane windows, and the like will combine to provide "distributed energy resources" (DER). In addition, "smart" buildings will combine DER and information technology to control the production and use of energy so as to maximize energy efficiency (e.g., by eliminating losses during long-distance transmission), user comfort, and productivity all at the same time.

Distributed energy resources are cleaner than their predecessors. In some cases, they allow users to exploit "waste" heat for productive purposes, thus greatly increasing overall efficiency. In others, they entail the prevention of waste in the first place. DER can also enable society to defer the upgrading of transmission and distribution lines,

which have a tremendous impact on land use. Those DER technologies that burn fuel generally do so at high efficiency, thereby minimizing emissions of air pollution; the others avoid combustion and its associated impacts altogether. While environmental benefits will contribute to the success of DER, many analysts nonetheless believe that the crucial factors are their flexibility, modularity, and compatibility with complex information technology.

Whither R&D? As a rule, new technologies for generating and delivering electricity take a lighter toll on the environment than old ones, if only because the former's higher efficiency reduces fuel use and emissions of waste products. New renewable and energy-efficiency technologies have some of the lightest impacts of all. These facts suggest that R&D will be crucial to safeguarding the environment in the future. Unfortunately, however, most utilities have scaled back their efforts in this area. According to the U.S. General Accounting Office, R&D spending by utilities dropped one-third between 1993 and 1996.⁽¹⁷⁾ This development appears to be a direct consequence of deregulation. In the past, regulatory commissions generally allowed power companies to pass on R&D costs (sometimes with a premium) directly to customers. In this era of deregulation, however, managers tend to believe that they cannot afford many R&D expenditures except those that cut costs in the short term.

In addition to their own R&D programs, since 1972 many utilities have supported research through the Electric Power Research Institute (EPRI), an industry association based in Palo Alto, California. But here, too, institutional changes have had an impact on R&D spending. In years past, EPRI put its members' dues into a single pot that financed all its activities. Now, however, members may designate the specific programs they wish to support, which may exacerbate the trend toward short-term R&D. In other ways, too, EPRI's search for a viable institutional structure in a market-oriented system has contributed to the uncertainty facing R&D. For instance, the U.S. Department of Justice has received complaints that EPRI and its members are illegally delaying the deployment of DER by transferring the research licenses for these technologies to EPRIGEN, its for-profit subsidiary, which has allegedly chosen to defer their development for competitive reasons. (Because EPRI funded this research with fees collected from ratepayers, the complainants argue that it should remain in the public domain.) The validity of the charge remains unclear, but the imbroglio illustrates the uncertain future facing public-interest R&D in a restructured electricity market.⁽¹⁸⁾

Air pollution versus radiation. A restructured utility system presents a cruel environmental choice: Of the 103 plants in the U.S. nuclear fleet, some will certainly prove too expensive to compete in an era of restructuring. In one sense, this is an environmental benefit, removing the threat of a catastrophic accident and eliminating the intergenerational quandary of how to dispose of radioactive waste. Yet nuclear power supplied about 20 percent of the United States' electricity needs in 1997.⁽¹⁹⁾ Even replacing those plants with natural gas facilities would drastically increase the nation's emissions

of greenhouse gases and perhaps other pollutants as well.

Other nuclear plants will prove attractive investments, especially in states where consumers have to recompense utilities for at least part of their "stranded costs," i.e., the costs of nuclear facilities and other assets deemed unable to compete in a restructured market. For example, Boston Edison will sell its Pilgrim reactor (which has a book value of \$700 million) to Entergy Corporation of New Orleans for \$80 million plus a guaranteed \$40 million in stranded cost payments. Likewise, AmerGen, a nuclear-focused joint venture between Philadelphia-based PECO Energy Company and British Energy, will purchase the still-functioning Three Mile Island Unit 1 reactor (which has a book value of \$600 million) for \$23 million plus another \$77 million for fuel already on order.(20) The purchasers of both of these plants seem to see competitive strength in becoming national nuclear power specialists, indicating that the story of nuclear power in the United States may not be entirely over.

Green power. The idea of a market for green power, in which consumers would purchase electricity generated from renewable resources at premium prices, has both raised hopes and aroused opprobrium. Optimists point out that one-half of the California households that opted to switch power providers chose green power. They envision a system in which electric companies seek to differentiate their brands on the basis of environmental impact - in other words, a system in which environmental commitment would be a competitive weapon. Noting that renewable energy now constitutes less than 2 percent of the total national power mix, they ask why environmentalists should feel an allegiance to a regulatory system that has long marginalized their concerns. Perhaps, they hope, retail competition will allow canny entrepreneurs to tap directly into the positive name recognition for renewable energy that survey after survey has uncovered.(21)

Pessimists sourly note that the 50,000 or so homes that buy green power in California represent a tiny fraction of the state's huge electricity market. They contend that most of the so-called green power draws on existing renewable energy facilities that were paid for by ratepayers long ago, not on new - and presumably more expensive - ones. And they dismiss green power as "greenwashing," a way for polluting companies to improve their image without genuinely helping the environment. While conceding that a large and genuinely green electricity market could help the environment, these skeptics put greater faith in strong government policy mechanisms such as the "renewable energy portfolio standard," which would require that a certain percentage of the electricity sold in a state be generated from qualifying renewable resources.(22)

A Way Forward?

Much of the optimism about restructuring reflects a faith in the benefits of natural gas and the possibility of a market transformation sparked by environmentally conscious purchases. The gas question is complex. Consider air pollution: Modern gas-burning facilities emit rather low levels of conventional air pollutants and only about one-

half the greenhouse gases per unit of electricity as coal facilities. Where gas replaces coal, it is an environmental winner; however, where it replaces nuclear facilities or meets new demand, it is an environmental loser. Some environmentalists therefore consider natural gas a "transition fuel." They believe, for instance, that gas could provide the technical and commercial infrastructure for a clean hydrogen economy. In one permutation of this vision, hydrogen made from natural gas and delivered by existing companies through existing pipelines could prepare consumers for hydrogen produced by electrolyzing water with current from renewable energy facilities.²³ Furthermore, analysts note that all distributed energy systems share policy and market needs; opening the system to gas-powered microturbines and fuel cells would benefit distributed biopower, photovoltaics, and other renewable energy technologies.

Yet as the United States moves toward coronating natural gas as the savior of the electric system, skeptics wonder darkly about the back end of the transition: Will the current tide of inexpensive gas swamp all competitors, dirtier and cleaner alike, leaving no zero-emission options to turn to if gas prices rise or the climate becomes dire? In other words, they are asking how we can use gas in a transition away from coal rather than as a convenient way of dodging tough questions about the future. (For more on the regulation and environmental significance of natural gas, see the box on this page.)

What about green markets? Are they a sham - a way for power companies to sell a small amount of renewable energy at premium prices while inflicting serious harm on the environment through their main product lines? Or are they the last, best hope of integrating environmentalism with consumerism? The evidence that is available so far is mixed.

Pilot programs that explored the functioning of retail markets indicated grounds for optimism, suggesting that people would buy green power even if it cost more. In Massachusetts, for example, 31 percent of program participants chose a green power option. But the optimism may not be entirely justified. For one thing, most pilot programs focused on residential customers, who account for only about one-third of electricity use in the United States. For another, participation in most programs was voluntary, and it may be that only those people likely to consider switching were involved. In actuality, green marketers must not only convince customers to buy their product; they must teach them what it means to shop for electricity in the first place and why they should do so. To date, no real-world green power market includes more than 3 percent of the potential residential customers, and some are a good deal smaller.

California's initial experience points to the difficulty of setting up an active power market. Aspiring power marketers assert that state policymakers have set misleadingly low prices for customers who choose not to leave their current utility, making it difficult or impossible for newcomers to compete on price. Indeed, Enron Energy Services, which was expected to be one of the leading purveyors of green power, stopped taking on new residential customers, saying that the high cost of educating and signing up

new customers far outweighed the potential profits?

Nevertheless, there are some encouraging signs. Pennsylvania has had much more success in fostering active retail markets for both green and conventional power by setting the price of staying with the current provider high enough to induce switching. The Land and Water Fund of the Rockies, an advocacy group, has cooperated with the Public Service Company of Colorado to market wind-based power; their customers include not only the state and several local governments but also major corporations such as Coors Brewing Company, Lockheed Martin Astronautics, and IBM. Green Mountain Energy Resources, a Vermont firm, is attempting to become a national green power marketer. And one California marketer, Commonwealth Energy, now derives all of its electricity from geothermal sources.

Principles for Restructuring

The evidence presented above suggests that to be successful, a restructured electric system should have seven fundamental characteristics:

Friendliness to innovation. The greatest failing of the existing electric system is its antipathy to revolutionary technology. What is needed is a flexible system that encourages both long- and short-term R&D and remains open to new technologies and changing consumer needs. To a certain extent, restructuring laws have reflected an understanding of the need for additional R&D. The California restructuring legislation passed in 1996, for example, requires the state's utilities to spend \$250 million on R&D for new and existing generation technologies through the end of 2001. Another \$540 million will be specifically allocated for research on renewable resources technologies. To encourage work on energy efficiency, the law mandates expenditures of at least \$872 million through the end of 2001. However, no requirements for research on renewable resource technologies or energy efficiency have been established for 2002 and subsequent years.

True competition. The rules governing the electricity industry should encourage the emergence of new, innovative firms and restrict the market power of established ones wherever that power tends to inhibit competition. Here too, California legislators took the lead by creating institutions intended to prevent existing utilities from gaining too much power in a restructured system. For example, the California Public Utilities Commission ordered 70 percent of the state's transmission lines to be transferred to a state-operated Independent System Operator. This body centralizes control over transmission networks, coordinates the scheduling and dispatching of power from suppliers, and provides open access to generators as a means of encouraging competition. Moreover, the commission has suggested that the state's utilities divest themselves of generating facilities. In other states, such as Massachusetts, restructuring laws have actually required such divestments.

True competition, however, requires more than just a number of

competitors. It also requires that consumers have relevant information so that they can make informed decisions. To help electricity shoppers, the California legislature passed a law in 1997 that requires retail suppliers to disclose the sources of their power. Thus, customers can learn what percentage of their electricity was generated from traditional fossil-fuel sources and what from renewable resources. In Texas, Governor George W. Bush recently signed a restructuring law authorizing the state's Public Utility Commission to establish rules by which retail electricity sellers must disclose the negative impacts of their power generation as well as provide proof that their claims regarding environmental benefits are valid.

Strategic environmental thinking. Corporate and government decision makers need to consider what type of electric system will meet U.S. society's air quality, climate, and other environmental goals. Where more competitive markets seem unlikely to meet those goals, minimal environmental standards should be imposed.

Even in a restructured electricity market, government regulation will not disappear altogether. Although state public utility commissions will no longer be involved in setting rates, they will still have some authority to deal with environmental matters. In Texas, for instance, the commission will be responsible for enforcing a new provision requiring all electricity suppliers to either develop their own renewable energy sources or buy credits from companies that have. Moreover, the law establishes a schedule for increasing the total amount of renewable energy used within the state. By 2003, suppliers must provide an additional 450 MW of electricity from renewable resources, and by 2009 they must have a total of 2,000 MW of new renewable generating capacity. The state utility commission will supervise these changes.

Self-sustaining markets. Renewable energy and energy-efficiency firms must seek self-sustaining markets; policymakers can help them to do so by removing the hidden biases toward conventional technologies. As noted above, the Texas restructuring legislation requires implementation of renewable technologies, partly in the hope that by 2009 those technologies will be mature enough to compete in the market without government assistance. In California, CEC will support technological advances part by identifying the most competitive new technologies and helping to foster a market for renewable resources (in by certifying and publicizing eligible renewable resource providers).

A preference for distributed energy. Because distributed energy resources tend to increase the efficiency and decrease the environmental impact of the electric utility system, they should be encouraged. Distributed energy faces a complex web of regulatory, statutory, and practical barriers, however. For example, regulations for connecting these technologies to the power grid differ not only among states but also from utility to utility, making it difficult for manufacturers to develop products for national or regional markets. Similarly, the spread of residential photovoltaic systems and other distributed energy technologies is limited by neighborhood covenants

that prohibit homeowners from altering their property in any visible way. In many cases, public policymakers can remove such barriers by requiring standardized approaches.

Comparable environmental standards. No existing facility should have a competitive advantage due to looser environmental requirements; in particular, old coal-burning plants should be required to meet the same environmental standards as new facilities. Some states have begun attacking the highly polluting power plants that have survived largely due to grandfather clauses in environmental laws. Here again, the new Texas restructuring law may be a trend setter. It requires that the older plants reduce nitrogen oxide emissions by 50 percent and sulfur dioxide emissions by 25 percent by May 2003. Though these plants will not be as clean as the newest gas-burning or renewable facilities, they will be much cleaner than they would have been under federal law alone.

Comprehensive environmental assessments. Policymakers should avoid replacing one environmental hazard with another (e.g., radioactive wastes with air pollution) if there is a more environmentally benign alternative. Achieving this goal will require a good deal of public and political activity. California took a major step in this direction in the 1970s, when it forbade the construction of new nuclear power plants until waste disposal and other problems were resolved. It has taken another important step in this decade by using regulatory actions to encourage the development and use of renewable resources. With deregulation, however, the role of the state's public utility commission has declined. Strong marketing of green electricity to consumers and further development of environmentally benign technologies within the free market will be needed to maintain the state's traditional friendliness to renewable resources.

As experience so far indicates, it will be no easy task to create an electricity sector with all of these characteristics. It will be especially difficult to preserve the vibrancy of a competitive market if the industry is required to meet so many other policy goals (and all the more so if it fails to maintain current environmental standards). As it happens, the prerequisite for attaining all these goals is the same: commitment on the part of the public. How can such commitment be fostered? The key may lie in green marketing - although not precisely for the reasons one might expect. The direct impact of green markets for power will probably be limited. The biggest obstacle to the emergence of such markets is the fact that few people understand the links between their own (often unconscious) decisions about energy use; the massive though often distant environmental degradation that may result from those decisions; and their own health and quality of life, as well as that of their children and grandchildren. Unlike in the case of low-fat or organic foods, most people see little personal advantage from buying green power.

Paradoxically, it is precisely because of such ignorance that green markets will be so important. Only through massive public education will the United States be able to create public support for green products and the policies necessary to protect the environment. And

given the conditions in the country today, only the private sector has the tools, the funds, and - potentially - the incentive to carry out this massive education campaign. Simply put, it is much easier to raise \$100 million for a business venture than it is for a regulatory initiative. (The box to the right offers some pointers for consumers interested in purchasing genuinely green electricity services.)

Buying green is ultimately a political act, an act that may be much more satisfying than signing a petition, sending an e-mail to a member of Congress, mailing a check to an environmental organization, or even (sad to say) voting for an environmentally sensitive politician. If green marketing takes off, however, people will probably be more inclined to do those things, too. Of course, there are risks to this strategy, and some environmentalists may regard it as "selling out." Nevertheless, as policymakers relinquish their authority to mandate environmental protection--which produced only modest results at best--green marketing may be the last, best hope for improving environmental conditions in a restructured electric utility industry.

NOTES

1. As defined by economists, a natural monopoly exists when an industry's long-run average costs decline as output increases (at least over the range that is relevant). In this situation, a single producer can achieve greater economies - and thus offer the good or service at a lower price - than a group of competing producers can. For decades, electric utility companies achieved huge economies of scale by acquiring increasingly powerful turbines, the largest of which produced 5 MW in 1905 and 1,300 MW in 1973. But a host of problems has limited further exploitation of such economies in recent decades. See R. E Hirsh, *Technology and Transformation in the American Electric Utility Industry* (New York: Cambridge University Press, 1989).

2. See G. L. Priest, "The Origins of Utility Regulation and the 'Theories of Regulation' Debate," *Journal of Law and Economics* 36, no. 2 (1993): 296.

3. Not everyone enjoyed the benefits of electricity provided by private utilities, however. During the industry's first several decades, power companies focused almost entirely on serving cities, where concentrations of consumers made it possible to spread the high costs of distribution fairly widely. As a result, by 1930 only 10 percent of farm homes had electricity, compared with 85 percent of urban homes. U.S. Bureau of the Census, *Historical Statistics of the United States: Colonial Times to 1970, Part 2* (Washington, D.C., 1973), S/III. The situation began to change when the federal government created the Tennessee Valley Authority in 1933 and the Rural Electrification Administration in 1935 (along with other agencies) to foster the provision of service to rural areas.

4. See J. R. Asperger, "California's Energy Commission: Illusions of a One-Stop Power Plant Siting Agency," *UCLA Law Review* 24 (1977): 1,313.

5. "Wisconsin PSC to State Utilities: Forget Nuclear," Energy Daily, 10 July 1978, 1.
6. In 1990, for example, the California legislature instructed regulators to "improve the environment and to encourage the diversity of energy sources through improvements in energy efficiency and development of renewable energy resources, such as wind, solar, biomass, and geothermal energy." California Public Utilities Code, section 701.1, as qualified by Statutes 1990, c. 1475 (AB 3995) and California Public Resources Code, section 25000.1. Fortunately for the utilities, the regulators allowed them to pass R&D costs on to their customers.
7. "WEPCO Ordered to Quadruple Conservation Spending: Will Get a Return on It," Electric Utility Week, 26 January 1987, 5.
8. Natural Resources Defense Council and Pacific Gas and Electric, "Energy Efficiency in the National Energy Strategy: NRDC and PG&E Find Common Ground," Electricity Journal 3 (1990): 47.
9. Energy Polio, Act of 1992, P.L. 102-486, 24 October 1992.
10. See, for example, P. Kemezis, "Retail Wheeling: New Hampshire Kicks Off Pilot Program after a Year of Debate," Electrical World, July 1996, 39; and J. Dao, "The Baby Bulbs: The End of the Last Great Monopoly," New York Times, 4 August 1996, 5.
11. The 19 states are Arizona, Arkansas, California, Connecticut, Delaware, Illinois, Maine, Maryland, Massachusetts, Montana, Nevada, New Hampshire, New Jersey, New Mexico, Oklahoma, Pennsylvania, Rhode Island, Texas, and Virginia. Three other states (Michigan, New York, and Vermont) effectively restructured their utility industries by comprehensively revising the regulations affecting those industries. See U.S. Department of Energy, Status of State Electric Utility Deregulation Activity as of June 1, 1999 (accessed via http://www.eia.doe.gov/cneaf/electricity/chg_str/regmap.html on 14 June 1999).
12. U.S. Department of Energy, Energy Information Administration, Annual Energy Outlook 1998, DOE/EIA-0383(98) (Washington, D.C., 1998), table 7 and page 51.
13. E. Thompson, Poisoned Power: How America's Outdated Electric Plants Harm Our Health and Environment (New York: Clean Air Network, 1997), 1-2.
14. Center for Clean Air Policy, Air Quality and Electric Restructuring: A Framework for Aligning Economic and Environmental Interests under Electric Restructuring (Washington, D.C., 1997).
15. Ibid. See also A. Serchuk and R. Means, Natural Gas: Bridge to a Renewable Energy Future (College Park, Md.: Renewable Energy

Policy Project, 1997) (available at <http://www.repp.org>).

16. U.S. Department of Energy, Electric Utility Demand-Side Management, 1997 (accessed via http://www.eia.doe.gov/cneaf/electricity/dsm/dsm_sum.html on 6 April 1999).

17. U.S. General Accounting Office, Changes in Electricity-Related R&D Funding (Washington, D.C., 1996), 6.

18. See B. Althouse, "Dear Attorney General: Are Utilities Suppressing Distributed Generation?," Public Utilities Fortnightly, 1 April 1999, 20; and "EPRI Responds: Industry Program Would Develop, Deploy Technologies," Public Utilities Fortnightly, 1 April 1999, 23.

19. U.S. Department of Energy, Nuclear Power Plant Operations, 1957-1997 (accessed via <http://www.eia.doe.gov/pub/energy/overview/aer/aer0902.txt> on 16 April 1999.)

20. P. Fenn, "Love Is Hate, War Is Peace, and Nuclear Power Is Green: The Coming Nuclear Revival," American Local Power News, April 1999 (accessed at <http://www.local.org> on 14 June 1999). See also "Pennsylvania Company Buying Nuclear Reactor," Times Herald-Record, 15 March 1999 (accessed at <http://www.th-record.com/1999/03/15/3milesal.htm> on 14 June 1999).

21. See G. Edge, "Green Power Marketing Makes Its Mark in Competitive Markets," Power Economics, November 1998, 15.

22. N. Rader, Green Buyers Beware: A Critical Review of "Green Electricity" Products (Washington, D.C.: Public Citizen, 1998).

23. See, for example, C. Flavin and N. Lenssen, Power Surge: Guide to the Coming Energy Revolution (New York: W. W. Norton and Company, 1994), 91-114 and 288-94.

24. Under California's program, only the generation of electricity will be competitive - the present provider will continue to bill customers for transmission, distribution, and other services. Customers of Enron Energy Services, for example, receive a two-page bill: The first page details Enron's charges for generating electricity; the second page provides information from the local utility regarding transmission and distribution charges. The second page is similar to previous statements except for a deduction equivalent to the current provider's cost of generation. Potential competitors complain that the state has essentially set this cost at the wholesale level. Thus, to compete on the basis of price, newcomers need to bring their total costs, including advertising and the other costs of retailing, down below the current provider's wholesale cost.

RELATED ARTICLE: THE PUBLIC UTILITY REGULATORY POLICIES ACT OF 1978

When President Jimmy Carter took office in 1977 (just four years after the first energy crisis), he made energy policy a top priority, sending Congress an ambitious National Energy Plan that would have reduced petroleum use, accelerated reliance on domestic fuels, and increased conservation efforts. Unwilling to take the drastic steps that the plan called for, Congress broke the plan up into five bills and debated them for more than a year. In November 1978, President Carter signed into law the weakened measures, one of which was the Public Utility Regulatory Policies Act (PURPA).

Primarily intended to revise the rate structures used to calculate customers' electricity bills, PURPA also included a short section allowing nonutility producers to sell power to utilities at relatively high and guaranteed rates. The new producers, however, were required to use fossil fuels very efficiently, such as in cogeneration processes. Entrepreneurs producing power from the sun and wind could also benefit from the lucrative rates paid by utilities. Despite PURPA's incentives, no one really anticipated that this section of the law would have much effect - or that its effects would be amplified by the tax incentives for renewable energy and cogeneration contained in another part of the National Energy Plan, the Energy Tax Act of 1978.

Innovative producers found a true home in California, however. Anxious to meet growing demand with environmentally sensitive technologies, California's legislators and regulators provided additional tax incentives for these producers and required utilities to pay high rates for their output. These inducements spurred a huge amount of research on nontraditional generating technologies, one result of which was that by the 1990s wind turbines had become competitive with fossil-fuel generation in several states. Whereas wind turbines provided just 173 megawatts of power in California in 1980, they supplied 1,756 megawatts in 1993.⁽¹⁾ Overall, the law stimulated the production of almost 20 billion kilowatt hours (kWh) from nontraditional (and non-fossil fuel) sources in California in 1995, compared with 1.5 billion kWh in 1983.⁽²⁾ Nationally, nonutility generating companies supplied 224.4 billion kWh of electricity in 1995, up from 15.6 billion kWh in 1983.⁽³⁾

Although it provides support for more environmentally sensitive power generation, PURPA has come under a great deal of criticism in this era of increasing deregulation. Many utility companies that are required to pay high rates to nontraditional producers have to pass those costs on to customers, thus making their power less competitive with that of nonutility firms. Opponents of PURPA, who have found supporters in Congress, want to see the law repealed, and at least three bills in the 106th Congress seek to do so.⁽⁴⁾

However, many supporters of renewable energy concede that PURPA's company-specific mandates may be ill suited to a market-oriented energy system. Instead, they propose a "renewable portfolio standard." This mechanism, which has already been implemented by a handful of states and is incorporated in the Clinton administration's restructuring bill (and several others), would require that all electricity sold at the retail level contain a certain percentage

of renewable energy. It would also create tradable "renewable energy credits" with which power retailers could meet that standard.

1. California Energy Commission, California Historical Energy Statistics, Publication P300-95-020 (Sacramento, 1995) (accessed via <http://www.energy.ca.gov/reports/stats/table35.html> on 20 January 1998).
2. California Energy Commission, Electrical Energy Generation in California, 1983 to 1995 (accessed via <http://www.energy.ca.gov/forecasting/electricity/electricitygen.html> on 5 January 1998).
3. Edison Electric Institute, 1995 Capacity and Generation of Non-Utility Sources of Energy (Washington, D.C., 1996), 30.
4. Senator Don Nickles (R-Okla.) introduced the first repeal bill in 1995. The epitome of simple, straightforward legislation, the 28-line bill (whose short title was the "Electric Utility Ratepayer Act") would have repealed the section of PURPA that requires utilities to purchase power from nonutility companies (see S.R. 708, 104th Cong., 1st sess., 6 April 1995). A similar bill (the "Ratepayer Protection Act") was introduced in the House of Representatives later that same year (see H.R. 2562, 104th Cong., 1st sess., 31 October 1995). Neither bill passed. Congress is currently considering three repeal bills, the "Transition to Competition in the Electric Industry Act" introduced by Senator Connie Mack (R-Fla.) (S.R. 282, 106th Cong., 1st sess., 21 January 1999); the "Electric Power Consumer Relief Act of 1999" introduced by Representative James Walsh (R-N.Y.) (H.R. 971, 106th Cong., 1st sess., 3 March 1999); and the "Ratepayer Protection Act" introduced by Representative Cliff Stearns (R-Fla.) (H.R. 1138, 106th Cong., 1st sess., 16 March 1999).

RELATED ARTICLE: NATURAL GAS

In the 1960s and 1970s, federal regulators limited the wellhead price of natural gas to protect consumers from rising costs. Ironically, however, prices remained high because the controls reduced the incentive to find new supplies. As the controls were gradually removed between 1978 and 1992, supplies rose and prices dropped dramatically. Today, new supplies of natural gas are being discovered faster than they are being used. Low prices have combined with highly efficient gas-burning generating equipment to make natural gas the fuel of choice for new power plants. It is not clear whether the gas industry can meet the projected demand at current prices, however. Natural gas probably cannot replace all of the coal-fired capacity in existence and in the planning stage.

On balance, shifting from coal to natural gas would benefit the environment. Natural gas is composed mostly of methane, a much more powerful greenhouse gas than carbon dioxide. As a result, leaks from pipelines, refueling stations, landfills, and other sources could be a significant problem. On the other hand, methane does not remain in the atmosphere as long as carbon dioxide, thus reducing its overall impact. More important, burning natural gas releases

significantly less carbon dioxide than does burning oil or coal (14 kg per gigajoule of energy versus 20 and 25 kg per gigajoule, respectively). There are two reasons for this: New gas turbines are more efficient than existing oil- and coal-burning power plants, and natural gas has a relatively high ratio of hydrogen (which combusts) to carbon (which does not).

There are, however, two large problems with burning natural gas. First, it would still release a large absolute quantity of carbon dioxide into the atmosphere. Second, although it contains no sulfur (and thus does not contribute to conventional air pollution or acid deposition), the older steam turbines that use natural gas emit substantial quantities of nitrogen oxides, which threaten both ecosystems and human health. New gas turbines operate at lower temperatures, however, and thus emit far less of these pollutants.

RELATED ARTICLE: SHOPPING FOR ELECTRICITY

The deregulation of the electric utility industry gives U.S. consumers more power than they have had for decades. Yet it also exposes them to greater risk and places more of the responsibility for safeguarding the environment directly on their shoulders. To be both savvy shoppers and environmentally responsible citizens, people should be asking questions such as the following:

- * How much does my electricity currently cost? How does that compare with the regional or national average? And is my bill likely to rise or fall in a free market?

- * How is the electricity that I currently use generated and what are the environmental impacts of using that technology? How do those impacts compare to those elsewhere in my region and in the United States as a whole? Does my electric utility employ the cleanest technologies available?

- * Will I be able to choose "green" electricity if I want it? Will my neighbors have the option of saving money by choosing dirtier electricity? Will the competing companies offer various options so that I can choose a mix of traditional and renewable energy sources that I feel comfortable with?

- * Will I receive simple, clear information about prices and other aspects of my electricity options so I can compare them, i.e., something like the labels showing the nutritional content of the foods I buy? Will I be protected against unscrupulous marketers and deceptive advertising? To whom can I turn if I believe I am being treated unfairly?

- * In a competitive market, will my electric service be more reliable or less? What guarantees can I exact from my electricity supplier given reduced state regulation?

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